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THE ELECTROTECHNICAL INDUSTRY IN THE SIX-YEAR PLAN

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In prewar Poland the productive capacity of the electrotechnical industry was limited, and was primarily geared to the production of consumers' goods. This situation came about as follows: (1) With the investment of foreign capital in the electrotechnical industry, management also was assumed by foreigners, who were not concerned with developing the industry into a key industry. (2) Mechanization of industry and trade and the electrification of villages was proceeding at a slow pace; this resulted in only a limited demand by the manufacturers of producers' goods for the products of the electrotechnical industry. (3) Since the management of the basic branches of national economy -- power, mining, and metallurgy -- was in foreign hands, electrotechnical producers' goods were supplied by parent concerns or firms with which they had financial connections.

Before the war, the electrotechnical industry did not manufacture such important products as turbogenerators, regulating equipment, and power transformers for the power industry; extraction equipment, mine locomotives, and coal cutters for the mining industry; drives for rolling mill machinery, and gravity feed installations for the metallurgical industry; electric locomotives, rectifier stations (mercury arc rectifiers, rectifier converters, high-speed direct-current switches) for the railroad industry; and commutator engines and rotary welding machines for the manufacturing industry. In some branches of the electrotechnical industry, production was limited to assembling imported parts usually supplied by the parent plant. This was especially apparent in the telephone and telegraph industry, the incandescent bulb industry, and in the production of surveying equipment.

As a result of war destruction, production of the electrotechnical industry in 1945 was about 13 percent of prewar production. In 1946, after initial organization, production reached 30 percent of prewar output. Later, the effects of physical destruction were removed, new factories were started, and the manufacture of producers' goods began to take a more important place in production. The following table shows the development of reconstruction and the growth of production:

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		1946	1949
Rotary machines	units	8.670	40,000
Transformers	MVA	75	810
Meters	units	6,260	185,000
Enamelled wire	tons	26	280
Standard incandescent bulbs	1,000 units	4,700	18,000

Production was started on commodities not previously manufactured, such as: coal cutters, gravity feed installations, rotary welding machines. In the fourth quarter of 1948, the level of prewar production (aggregate value) was exceeded. The Three-Year Plan estimated that the prewar production level would be reached in 1949.

The goals set forth in the Three-Year Plan for Economic Reconstruction will be achieved by the electrotechnical industry in the third quarter of 1949. The percentage of prewar (1938) production to be achieved in 1949 follows (for 1938, value of production in 1937 prices taken from Wiadomosci Statystyczne was used; for 1949, the estimated achievement of the plan): electric machines, 176; transformers, 182; storage batteries and cells, 196; cables, 147; meters, 212; incandescent bulbs, 198.

It is estimated that whereas the total production of all industry will double in the 6-year period and the production of the metal industry will increase two and a half times, the production of the electrotechnical industry will be tripled and in some of its branches will show an even greater increase.

The guiding principles of the Six-Year Plan of Development and Economic Reformation estimate that the value of industrial production of the electrotechnical industry in 1955 will amount to at least 980 million zlotys in 1937 prices or 280 percent of 1949 production. Special attention will be given to the manufacture of electrical machines and apparatus and to widening the range of production.

The percentage share of the various branches of the electrotechnical industry in its total production (which is taken as 100) for the given years is as follows:

Industry	1946	1949	1955
Electric machine	15.9	17.5	22.5
Equipment	16.3	18.5	23.0
Cable and wire	38.6	29.0	18.4
Storage battery and cell	12.0	7.7	5.4
Telephone and telegraph	5.9	13.7	15.8
Electric bulb	11.3	13.6	14.9

As shown above, the cables, wires, storage batteries and cells will represent a smaller share in total production in 1955, although the actual value of production for these branches will double between 1949 and 1955.

The wire industry expects to introduce new types of insulation for coil winding wires for electric machines and equipment. This will permit greater loading of machines and reduce the consumption of basic raw materials such as steel, copper and aluminum. New types of insulated wires will be introduced to meet the requirements of mining and construction.

The cable industry will be required to manufacture special types of cables and wires for the expansion of communications. The chemical industry must master the production of the necessary synthetic insulation material.

An adequate supply of high-tension wires, aluminum cables, and aluminum steel must be assured for the power industry. In the production of insulated wires, aluminum should be introduced. This would eventually result in great saving when the plan for residential and industrial construction is put into effect.

In connection with the electrification of railroads and mines, the demand for trolley wires will be several times greater than hitherto.

The storage battery industry will be a steady producer for the automotive industry and will also supply batteries for replacements. For railroads and mine lighting, it will be necessary to introduce the production of iron and nickel storage batteries. With a more advantageous use of domestic raw materials, production of pocket-size batteries should reach 20 million by 1955.

In 1955, production of electric machines, according to present provisions of the Six-Year Plan, will increase more than threefold as compared with 1949. The production of asynchronous motors calculated in aggregate horsepower will increase to more than six and a half times between 1949 and 1955. A modern plant for the manufacture of motors and geared for mass production will be erected.

The calculated increase in the production of transformers is based on the planned reconstruction of power plants and industrial networks. The annual production of transformers will double while the capacity of transformers produced will increase one and one half times, indicating the production of more high-voltage transformers. In the period of the Six-Year Plan, the manufacture of power transformers will begin, at first using imported circuit changes and later circuit changers of domestic manufacture.

Production of turbogenerators, electric locomotives, and rectifier stations for traction purposes will be introduced in the period of the Six-Year Plan.

The electric machine industry will also increase production of marine engines, heavy motors for milling machines and mining extraction machines, dynamos, automobile starters, and electrical tools.

Production of electrical equipment will be quadrupled between 1949 and 1955. With the expansion of the power network and with the increase of installed capacity in the power plants it will be necessary to secure high-voltage circuit breakers for the electric power plants and for the big power consumers (mining, metallurgy, and chemical industries). The rebuilding and modernization of heavy industry and of the manufacturing industry will create a large demand for measuring equipment (the production of which will increase more than fourfold) and low-voltage distributors.

The great demand for heaters, electrical household appliances, and lighting equipment will be partly filled by increased production of local industries. It is estimated that the production of heaters and household appliances by the centrally managed state industry will increase fivefold. The 1955 production should amount to 2,400 tons valued at 15 million prewar zlotys. In 1938, factories employing over 5 workers produced 631 tons of electric household appliances valued at 3,150,000 zlotys.

The growing telecommunications division of the electrctechnical industry must start manufacturing transmission equipment to improve the efficiency of postal communications. In radio, 1955 production of receivers is estimated at 350,000 (142,000 in 1938 and 5,200 in 1947). There will also be an adequate production of amplifiers and loudspeakers for radio junctions. The production of telephone switchboards for 1955 will be six times that for 1949.

By the end of the 6-year period, the annual production of electric bulbs will exceed 30 million or 170 percent of the 1949 production. At the same time, production of fluorescent lights, sodium vapor lamps, automobile lights, etc., will be started. Production of radio tubes will be entirely adequate to cover the requirements of the radio industry.

In the period of the Six-Year Plan, the manufacture of electric light bulbs will be greatly expanded, and will use such domestic semimanufactures as spirals, electrodes, etc.

A number of new electrotechnical plants will be erected in the less industrialized areas: Rzeszow, Lublin, Bialystok.

Labor productivity over the 6-year period will increase more than 45 percent over 1949.

Although the effects of physical destruction have been removed in the process of rebuilding the electrotechnical industry, modernization has not yet been effected. In most plants, prewar methods are still being used; specialization and conversion to mass production is just beginning. The modernization of the electrotechnical industry forms an important problem of the Six-Year Plan.

To achieve the production goal set up in the Six-Year Plan and simultaneously increase productivity, decrease internal costs, and improve the quality of production, the electrotechnical industry must solve the basic problems of technology and personnel training.

The technological plan must embrace innovations in technology and production organization. For instance, the cable industry must anticipate changes attendant upon the introduction of continuous vulcanization of rubberized wires. The management will set up a plan of modernization for the entire branch of industry and then for each individual plant. The management of a plant will measure its performance with respect to planned changes in methods of production, assembly, quality control, production layout, and equipment, by comparing its index of technical achievement with the indexes as set up by the plan.

Technological indexes for Polish industry should be compared with the corresponding figures for Soviet, Czechoslovak, or American industry to steer investments to those branches of production in which technological innovations are most urgently required.

The electrotechnical industry will need to cooperate very closely with the scientific institutes, especially with the Institute of Electrotechnology and the Telephone and Telegraph Communications Institute.

The chief problem in the production of electrical apparatus will be to activate, in cooperation with the Institute of Electrotechnology, a high-voltage station for the testing of high-voltage cutouts. On the basis of experiments at this station, the engineering designers will be able to develop modern cutouts for the smooth operation of a power network.

The problem of trained workers for the industry has so far not been solved. The industrial schools, high schools, and secondary schools are already supplying the industry with trained workers in the intermediate and lower levels, and the program of training courses at the factories will help increase the staffs. Organized cooperation with the Trade Union of Metal Workers and continuous adjustments in the training program based on experience will assure an adequate supply of trained workers on the intermediate and lower levels by the end of 1955.

The problem of advanced education remains to be worked out. The prewar types of graduate schools did not meet the requirements of a fast developing modern electrotechnical industry independent of foreign influence. A curriculum now being worked out for the electrical departments of polytechnical schools will fit the needs of modern industry. Two degrees will be conferred, a lower degree for professional technicians and a higher degree for teaching. The actual training of engineers and technicians in new methods is still far from realization.

The Association of Polish Electricians plays an important role. It will not only cooperate in planning and controlling production, technological, and investment plans but will also contribute to the training of new staffs of specialists.

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